National Center for Science and Engineering Statistics

InfoBrief

Federally Funded R&D Centers Report 3% Increase in R&D Spending in FY 2020

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The nation's 42 federally funded research and development centers (FFRDCs) spent $23.5 billion on research and development in FY 2020, an annual increase of 3.4% in current dollars (**table 1**).[1] The federal government's share of support reached $23.1 billion in FY 2020 and represented a 3.6% increase in federal R&D support to FFRDCs—the seventh consecutive year of nominal growth after performance declines in FYs 2011–13. In constant dollars, total FFRDC R&D expenditures rose an average of 0.9% annually from 2011 to 2020 (**figure 1**). These and the other statistics in this report come from the FY 2020 FFRDC Research and Development Survey, conducted by the National Center for Science and Engineering Statistics within the National Science Foundation.

Table 1

R&D expenditures at federally funded research and development centers, by source of funds: FYs 2011–20

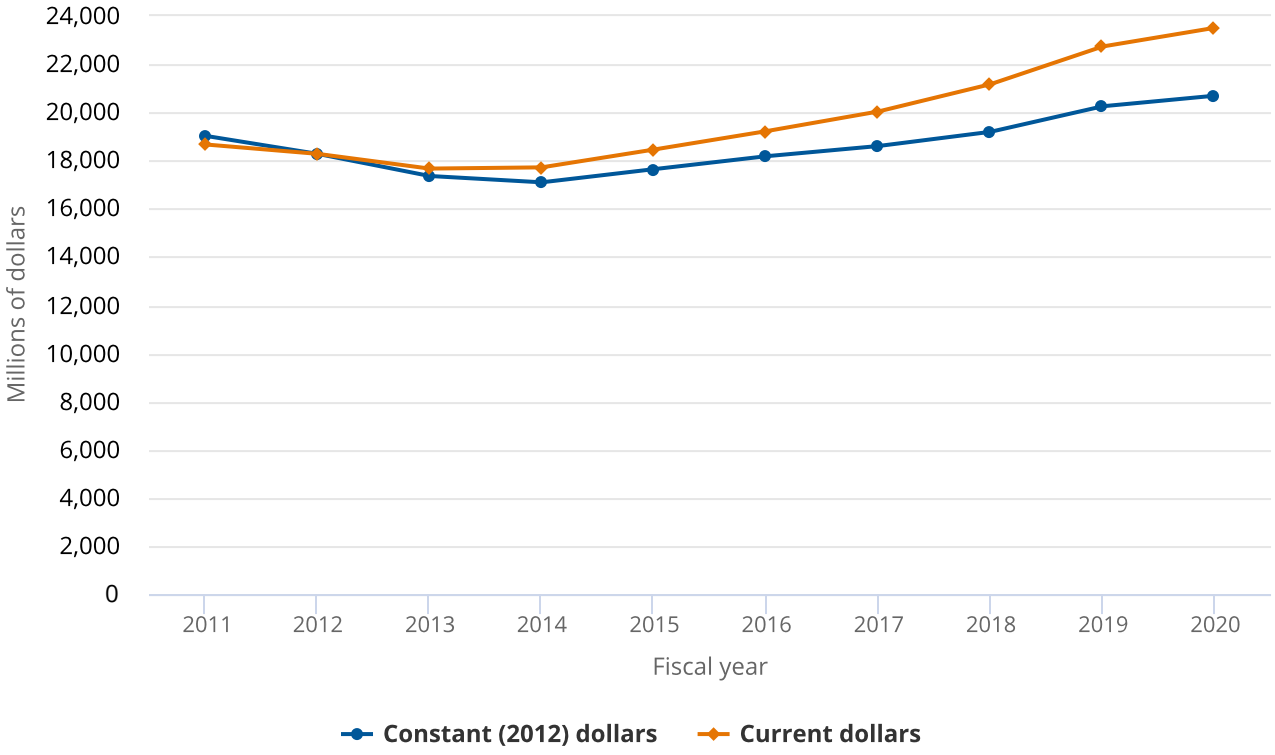
(Thousands of current dollars)

Fiscal year	All R&D expenditures	Federal government	State and local government	Business	Nonprofit organizations	All other sources
2011	18,671,245	18,276,088	26,744	190,111	38,878	139,424
2012	18,280,943	17,875,012	39,428	184,434	45,926	136,143
2013	17,667,184	17,284,513	50,449	186,911	39,390	105,921
2014	17,718,556	17,331,396	28,337	220,735	37,182	100,906
2015	18,458,257	18,097,189	18,427	208,780	27,984	105,877
2016	19,219,702	18,855,593	21,556	192,239	40,195	110,119
2017	20,038,307	19,667,804	29,029	192,107	46,526	102,841
2018	21,171,529	20,770,388	43,458	197,975	43,630	116,078
2019	22,737,500	22,338,855	51,167	180,583	48,238	118,657
2020	23,514,241	23,133,501	43,995	172,866	47,056	116,823

Source(s):
National Center for Science and Engineering Statistics, FFRDC Research and Development Survey.

Figure 1

Total R&D expenditures at federally funded research and development centers: FYs 2011–20



Source(s):
National Center for Science and Engineering Statistics, FFRDC Research and Development Survey.

R&D by Funding Source

FFRDCs are privately operated R&D organizations that are exclusively or substantially financed by the federal government. Over 98% ($23.1 billion) of FFRDC R&D expenditures were funded by the federal government in FY 2020 (table 1). Nonfederal sources funded the remaining R&D, totaling about $380.7 million, including businesses ($172.9 million); nonprofit organizations ($47.1 million); state and local governments ($44.0 million); and all other sources ($116.8 million), such as funds from foreign governments and foreign or U.S. universities.

Federal Agency Sources of R&D Funding

Almost 91% of federally funded R&D expenditures at FFRDCs came from four agencies (table 2). The Department of Energy (DOE) ($12.1 billion) accounted for 53% of federally funded R&D spending. The Department of Defense (DOD) ($5.1 billion, or 22%), National Aeronautics and Space Administration ($2.8 billion, or 12%), and the Department of Health and Human Services ($1.1 billion, or 4.6%), which includes the National Institutes of Health, were the only other agencies funding greater than $1 billion. Just under $2 billion of federally funded R&D came from agencies other than the largest four. FFRDCs identified 28 agencies as sources of federal funding.

Table 2

Federally financed R&D expenditures at federally funded research and development centers, by federal agency: FY 2020

(Thousands of current dollars)

FFRDC	All federal R&D expenditures
All FFRDCs	23,133,501
Administrative Office of the U.S. Courts	6,708
Agency for International Development	7,737
Central Intelligence Agency	2,146
Consumer Financial Protection Bureau	156
Consumer Product Safety Commission	440
Department of Agriculture	4,002
Department of Commerce	69,597
Department of Defense	5,136,824
Department of Energy	12,148,340
Department of Health and Human Services	1,058,779
Department of Homeland Security	509,718
Department of Justice	29,733
Department of State	53,587
Department of the Interior	11,159
Department of the Treasury	124,270
Department of Transportation	208,744
Department of Veterans Affairs	85,451
Environmental Protection Agency	6,811
Executive Office of the President	528
Federal Deposit Insurance Corporation	508
Federal Retirement Thrift Investment Board	251
General Services Administration	1,188
National Aeronautics and Space Administration	2,846,866
National Science Foundation	319,755
Nuclear Regulatory Commission	47,634
Office of the Director of National Intelligence	9,244
Smithsonian Institution	9
U.S. Postal Service	1,832
Other agencies not listed[a]	441,484

FFRDC = federally funded research and development center.

[a] Some funding sources were not identified for security reasons or because the original source was not known.

Source(s):
National Center for Science and Engineering Statistics, FFRDC Research and Development Survey, FY 2020.

Expenditure Trends at Specific FFRDCs

The majority of FFRDCs (26 centers) increased R&D spending in FY 2020 compared with FY 2019, with 6 centers reporting an increase greater than 10% (table 3).[2] Nine FFRDCs reported more than $1 billion each (a combined $16.4 billion) in R&D expenditures for FY 2020: the National Aeronautics and Space Administration–sponsored Jet Propulsion Laboratory; five DOE-sponsored national laboratories specializing in energy and the environment, national security, and nuclear science (Lawrence Livermore, Los Alamos, Oak Ridge, Pacific Northwest, and Sandia); the DOD-sponsored National Security Engineering Center; Lincoln Laboratory (jointly sponsored by the DOD and the Office of the Secretary of Defense); and the Aerospace FFRDC, which is jointly sponsored by DOD and the Air Force. Sandia National Laboratories was the largest

performer, with almost $3.4 billion in total R&D. Los Alamos National Laboratory and Oak Ridge National Laboratory reported the largest dollar increases in R&D of any centers, increasing by $261 million and $162 million, respectively, in FY 2020. Lower expenditures were recorded by 16 FFRDCs in FY 2020, with 2 centers declining more than 10%. Of the 41 FFRDCs listed continuously since 2016, 33 centers reported larger expenditures in FY 2020 compared to FY 2016.

Table 3

R&D expenditures at federally funded research and development centers, by FFRDC: FYs 2016–20

(Thousands of current dollars)

FFRDC	2016	2017	2018	2019	2020	% change 2019–20
All FFRDCs	19,219,702	20,038,307	21,171,529	22,737,500	23,514,241	3.4
University-administered FFRDCs	5,669,908	6,155,252	6,715,338	6,946,262	7,003,132	0.8
Ames Laboratory	46,886	53,527	36,858	33,612	32,844	-2.3
Argonne National Laboratory	733,377	723,824	777,246	810,693	859,658	6.0
Fermi National Accelerator Laboratory	323,507	320,516	328,419	334,258	300,002	-10.2
Jet Propulsion Laboratory	1,852,369	2,324,826	2,733,908	2,709,063	2,638,412	-2.6
Lawrence Berkeley National Laboratory	797,831	813,267	832,457	872,237	916,082	5.0
Lincoln Laboratory	949,138	969,090	1,013,320	1,103,870	1,115,927	1.1
National Center for Atmospheric Research	177,422	171,551	158,260	199,476	188,484	-5.5
National Radio Astronomy Observatory	90,411	91,720	100,691	101,901	100,078	-1.8
National Solar Observatory	12,783	11,841	14,733	15,931	16,892	6.0
NSF's National Optical-Infrared Astronomy Research Laboratory (NSF's NOIRLab)	24,917	25,906	33,874	38,262	72,686	90.0
Princeton Plasma Physics Laboratory	82,246	81,444	82,435	91,271	107,662	18.0
SLAC National Accelerator Laboratory	313,031	327,453	341,615	368,938	382,264	3.6
Software Engineering Institute	145,981	132,967	142,891	140,954	141,291	0.2
Thomas Jefferson National Accelerator Facility	120,009	107,320	118,631	125,796	130,850	4.0
Nonprofit-administered FFRDCs	6,128,058	6,413,612	6,617,274	7,033,162	7,419,509	5.5
Aerospace Federally Funded Research and Development Center	909,868	942,704	1,020,827	1,065,989	1,114,741	4.6
Arroyo Center	44,616	42,723	39,738	37,956	35,248	-7.1
Brookhaven National Laboratory	579,087	556,875	552,640	590,470	595,466	0.8
Center for Advanced Aviation System Development	156,644	168,169	177,530	174,123	180,634	3.7
Center for Communications and Computing	61,625	66,692	68,237	68,371	67,072	-1.9
Center for Enterprise Modernization	146,436	154,933	162,690	174,712	190,408	9.0
Center for Naval Analyses	84,232	90,401	95,198	96,697	95,874	-0.9
Center for Nuclear Waste Regulatory Analyses	8,600	6,312	5,054	6,987	6,762	-3.2
CMS Alliance to Modernize Healthcare	141,860	169,013	175,030	213,369	228,162	6.9
Homeland Security Operational Analysis Center	na	8622	46321	54,751	44,736	-18.3
Homeland Security Studies and Analysis Institute	22,038	na	na	na	na	
Homeland Security Systems Engineering and Development Institute	101,628	104,414	104,689	115,813	136,874	18.2
Judiciary Engineering and Modernization Center	9,289	8,030	6,697	7,331	6,765	-7.7
National Biodefense Analysis and Countermeasures Center	32,902	34,991	37,598	39,003	42,330	8.5
National Cybersecurity Center of Excellence	13,076	13,436	19,556	22,205	23,557	6.1
National Defense Research Institute	62,848	69,013	57,743	67,647	64,134	-5.2
National Renewable Energy Laboratory	362,087	357,916	388,500	455,016	511,585	12.4
National Security Engineering Center	966,542	1,012,155	1,078,610	1,124,861	1,143,701	1.7
Oak Ridge National Laboratory	1,283,729	1,403,204	1,399,445	1,470,372	1,632,684	11.0
Pacific Northwest National Laboratory	914,747	983,962	956,193	1,012,136	1,071,249	5.8
Project Air Force	49,165	48,521	48,858	48,325	46,936	-2.9
Science and Technology Policy Institute	7,459	8,401	8,086	9,080	9,256	1.9
Systems and Analyses Center	169,580	163,125	168,034	177,948	171,335	-3.7

Table 3

R&D expenditures at federally funded research and development centers, by FFRDC: FYs 2016–20

(Thousands of current dollars)

FFRDC	2016	2017	2018	2019	2020	% change 2019–20
Industry-administered FFRDCs	7,421,736	7,469,443	7,838,917	8,758,076	9,091,600	3.8
Frederick National Laboratory for Cancer Research	642,165	704,223	748,500	751,452	745,726	-0.8
Idaho National Laboratory	521,618	482,840	395,112	478,324	494,094	3.3
Lawrence Livermore National Laboratory	1,363,525	1,290,134	1,386,687	1,517,429	1,558,071	2.7
Los Alamos National Laboratory	1,987,000	1,972,769	2,145,232	2,461,275	2,722,375	10.6
Sandia National Laboratories	2,781,547	2,878,000	3,009,105	3,373,217	3,395,241	0.7
Savannah River National Laboratory	125,881	141,477	154,281	176,379	176,093	-0.2

na = not applicable.

FFRDC = federally funded research and development center; NSF = National Science Foundation.

Source(s):
National Center for Science and Engineering Statistics, FFRDC Research and Development Survey.

Expenditures, by Type of R&D

In FY 2020, basic research activities accounted for 20% of total FFRDC R&D expenditures, 2 percentage points lower than in FY 2016 (table 4). The remaining R&D expenditures were divided evenly between applied research and experimental development (at about 40% each). Overall, total basic research expenditures at FFRDCs increased by $488 million in current dollars from FY 2016 to FY 2020. Applied research expenditures and experimental development each increased by $1.9 billion during the same period.

Table 4

R&D expenditures at federally funded research and development centers, by type of R&D: FYs 2016–20

(Millions of current dollars and percent)

Fiscal year	All R&D expenditures	Basic research		Applied research		Experimental development	
		Amount	Percent	Amount	Percent	Amount	Percent
2016	19,220	4,224	22.0	7,527	39.2	7,468	38.9
2017	20,038	4,111	20.5	7,931	39.6	7,996	39.9
2018	21,172	4,180	19.7	8,391	39.6	8,600	40.6
2019	22,738	4,536	19.9	9,200	40.5	9,002	39.6
2020	23,514	4,712	20.0	9,433	40.1	9,369	39.8

Note(s):
Detail may not add to total because of rounding.

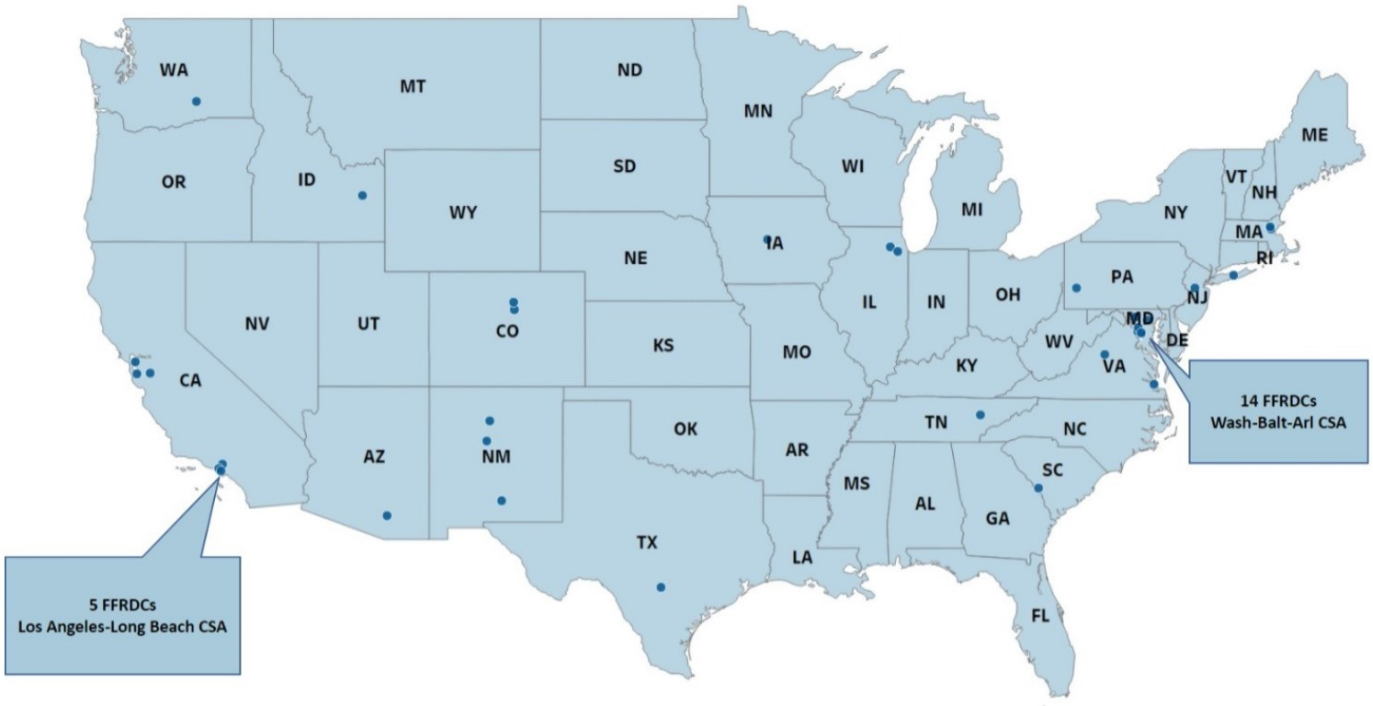
Source(s):
National Center for Science and Engineering Statistics, FFRDC Research and Development Survey.

Locations of FFRDCs

The 42 FFRDCs are located in 17 states and the District of Columbia (figure 2). Virginia, with 11 research centers, and California, with 8 research centers, have the most FFRDCs. Other states with several FFRDCs include Maryland (4), New Mexico (3), Colorado (2), Illinois (2), and Massachusetts (2). The National Security Engineering Center is the only FFRDC with locations in two states: Massachusetts and Virginia. The Washington-Baltimore-Arlington Combined Statistical Area (CSA) includes 14 FFRDCs due to the proximity of the federal government, although the R&D conducted by these FFRDCs totaled only $2.5 billion in FY 2020. The Los Angeles–Long Beach CSA included 5 FFRDCs with $3.9 billion in R&D, and the San Jose–San Francisco–Oakland CSA included 3 FFRDCs with R&D of $2.9 billion.[3]

Figure 2

Locations of federally funded research and development centers: FY 2020



CSA = combined statistical area; FFRDC = federally funded research and development center; Wash-Balt-Arl = Washington-Baltimore-Arlington.

Source(s):
National Center for Science and Engineering Statistics, FFRDC Research and Development Survey, FY 2020.

Data Sources, Limitations, and Availability

The statistics on FFRDC R&D expenditures presented in this report come from the FY 2020 FFRDC Research and Development Survey. This annual survey is completed by FFRDC administrators and collects data from FFRDCs on R&D expenditures by source of funds (federal government, state and local governments, businesses, nonprofit organizations, or other); federal agency source; type of R&D (basic research, applied research, or experimental development); type of cost (salaries, software, equipment, subcontracts, other direct costs, and indirect costs); and total operating budget. This survey has been a census of the full population of FFRDCs since FY 2001. For a list of criteria used to define the set of FFRDCs, see the general guidelines of the Master Government List of FFRDCs at https://www.nsf.gov/statistics/ffrdclist/#guide&gennotes.

The full set of data tables from this survey and more information on the survey methodology are available at https://ncses.nsf.gov/pubs/nsf22304/.

Notes

1 The National Center for Science and Engineering Statistics was informed in June 2021 that the Green Bank Observatory separated from the National Radio Astronomy Observatory in October 2016 to become an independent institution; both retained FFRDC status. The Master Government List of FFRDCs was subsequently updated to reflect this change.

2 On 1 October 2019, the National Optical Astronomy Observatory was renamed NSF's National Optical-Infrared Astronomy Research Laboratory. The new laboratory also incorporates operations of the International Gemini Observatory and the Vera C. Rubin Observatory. This new organization contributed to the 90% growth in R&D in FY 2020. See also https://noirlab.edu/public/about/history-of-noao/.

3 Definitions of CSAs of the United States and Puerto Rico can be found at https://www.census.gov/geographies/reference-maps/2020/geo/csa.html.

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